Operators Manual
for
2513-JE Cart Jetter

O'BRIEN®

A Product of Hi-Vac® Corporation

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Congratulations

We at Hi-Vac Corporation wish to express our appreciation on your purchase of a water-jetting sewer cleaner (jetter).

With you in mind, our skilled craftsmen have designed and assembled the finest water-jetting sewer cleaner available.

This manual includes operating instructions, maintenance instructions, and instructions for troubleshooting.

Your jetter is built for dependability, and will bring you years of service, as long as maintenance is performed regularly and a qualified person operates the jetter.

Sincerely,

Hi-Vac Corporation

History

Your new O'Brien water jet unit is the latest model developed in over 40 years of producing sewer-cleaning equipment.

Depending on your pump, over 2,000 psi water pressure can be generated. This pressure is directed through the hose to a nozzle, which is propelled into the sewer line by a rearward directed force of water. Just the right amount of water plus pressure is needed to effectively clean the pipe and neither high pressure nor large amounts of water alone will do the job.

With just the right combination at your disposal you will find the jet nozzle will carry the weight of the hose into the pipe. With the penetrator installed (we recommend that your cleaning begin with the penetrator nozzle) it should penetrate most blockages of grease, sand, mud etc. that clog the line.

Normally, the penetrator nozzle is used to scour the inside of the pipe. The actual cleaning of the pipe is done as the hose is being retracted from the pipe onto the reel. You will note that this brings out the source of the blockage. Little or no cleaning is done while entering the sewer either with the penetrator or other nozzles. Therefore it is very important that when retracting the hose a slow steady speed is used. Many times it is necessary to repeat this slow retracting process to thoroughly clean the pipe.

Hi-Vac's years of experience in developing and using various pressures and flows have not succeeded in being able to cut roots by pressure alone. Although some manufacturers state that extremely high pressure will remove roots, Hi-Vac has not been able to confirm or verify these statements. Instead, Hi-Vac offers the patented original water powered root cutter unit.

When any root systems are encountered, we highly recommend the O'Brien Root Cutter machine, which not only cuts any roots in the system but other blockages such as starch and grease build-ups. The Root Cutter also is an aid in indicating broken or caved-in tile pipe or sewers.

Before operating the unit, read the enclosed engine and pump manuals carefully and review the safety information in great detail.

Warranty Registration Instructions

Immediately upon receiving:

- Examine the unit for damage. Notify the carrier at once with any claims.
- The Warranty/Registration Card is located in the front of your owner's manual. The consumer must fill out the Warranty/Registration Card and mail back to Hi-Vac Corporation within ten (10) working days. The warranty is provided below.
- The Hi-Vac Corporation identification tag contains product identification information which is also provided on the cover sheet inside your Operator's Manual. Record the required information in the space provide below. This information **must** be provided when filing a warranty claim or ordering parts.

Serial No. _____

Model No._____

- **RETAIN THIS INFORMATION FOR FURTHER USE**
- **HAVE THIS INFORMATION WHEN FILING A WARRANTY CLAIM OR ORDERING PARTS**

Warranty

Each and every product manufactured by Hi-Vac Corporation is tested carefully prior to shipment to assure a high standard of quality and maximum operating efficiency. The following warranty is operative upon the receipt, by Hi-Vac Corporation, of a properly completed and executed warranty registration card.

A. Hi-Vac Corporation warrants that sewer units, equipment, accessories and parts manufactured by Hi-Vac Corporation shall for a period of one (1) year from date of purchase be free from:
    1. Defects in material and workmanship.
    2. Defects arising from process of manufacturing.
    3. Defects in design thereof.

B. The foregoing warranty shall not apply to components supplied to Hi-Vac Corporation by other manufacturers and the purchaser is directed to contact said individual manufacturers nearest factory service center for repair or replacement of said components. Hi-Vac Corporation, when necessary, will act as agent to secure adjustment. Purchaser is responsible for labor and freight of any return part/components.

C. In case of defects in material or workmanship or defects arising from processes of manufacture or design, such defects must become apparent in the machine, accessory, equipment, or part within (1) year from date of purchase. The extent of Hi-Vac Corporation's liability under the warranty is limited to the repair of such defects or to the repair or replacement of any part, equipment, or accessory, which is defective in any such respects.

D. Hi-Vac Corporation shall, as to each defect, be relieved of all obligations and liability under this warranty if:
    1. The product is operated with any accessory, equipment, or part not specifically approved by Hi-Vac Corporation and not manufactured by Hi-Vac Corporation unless purchaser furnishes reasonable evidence that such installation was not the case of the defect.
    2. The product is not operated or maintained in accordance with Hi-Vac Corporation's operation manual furnished with said equipment.
    3. The product was modified, altered, or repaired without the approval of Hi-Vac Corporation.
    4. The purchaser does not, within the applicable time period set forth in paragraphs A and C above; notify Hi-Vac Corporation of said defect. Disassembly of the product to correct the defect, removal of the defective accessory, new part(s) and reassembly of the product shall be at the purchaser's expense.
    5. Purchaser does not submit reasonable proof that the defect is due to a material embraced within Hi-Vac Corporation's warranty hereunder.

    Liability under this warranty is limited to parts and is furthermore limited to the replacement or repair of said parts returned, freight prepaid, to Hi-Vac Corporation. Only parts deemed defective due to workmanship or a related defect will be warranted. A Return Goods Authorization (RGA) number and completed warranty evaluation form are required prior to the return of any part(s) to Hi-Vac Corporation.
    Under no circumstances is loss of time, revenue, or consequential damages covered under this warranty.
    Any part(s) returned without proper pre-authorization will be returned/refused. Technical Service will supply the RGA. Please phone Technical Service @ 800.752.2400 to obtain the proper authorization or with any other service related question.

Maintenance

This section covers maintenance procedures not covered by the manufacturers' instruction manuals. Please follow the manufacturers' instructions for engine, pump and power take-off maintenance.

Fluid Levels

1. Water Pump – Oil	Check tank fill daily	Fill with 30 W SEA oil
2. Engine Oil	Check tank fill daily	Fill with 10W-30 oil

Jetter Operation Safety Precautions

△**WARNING Read** manual and supplemental(s) before operating water jetter. Read and become familiar with all safety precautions, pre-operation notes and details, operating instructions and manual operating instructions before operating your jetter.

△**WARNING** Inspect jetter before operation. Do not operate jetter if you suspect damage, wear or any abnormal condition.

△**WARNING Keep** operator and bystanders clear of area in which high pressure hose operates.

△**WARNING** Do not overload or abuse water jetter unit.

△**WARNING Do** not operate jetter while on medications, narcotics, or while intoxicated. Always wear protective clothing and eye protection when operating equipment.

△**WARNING** Do not allow children to operate equipment.

△**WARNING** This equipment can be hazardous to the operator's safety, and only authorized personnel who have read and understand the installation and operating manual should be permitted to operate this unit.

△**WARNING Do** not allow equipment to run unattended.

△**WARNING This** unit may conduct static electricity through the discharge nozzle, and is not designed for cleaning applications using combustible liquids, materials, or flammable gases. To do so could result in severe or fatal injury.

△**WARNING** Do not use any type of insecticide, toxic chemicals, or heat-activated chemicals that produce toxic fumes or explosive materials in the soap solution system of this equipment. Use only those detergents proven safe for human contact. Failure to do so could result in severe or fatal injury.

△**WARNING Do** not keep gun trigger open by mechanical means when using washdown gun.

△**WARNING Do** Not stand or allow other personnel to stand in front of the cleaning gun nozzle and avoid contact with hot water discharge if connected to hot water source. To do so could result in severe bodily injury.

△**WARNING Bleed** off all pressure prior to removal of nozzles, hoses, or drain plugs.

△**WARNING** Position and secure hose and reel before transporting jetter.

△**WARNING Accidental** activation of control switch (es) may cause unintended operation(s).

△**WARNING** Maintenance and lubrication procedures must be performed as specified in this manual by qualified (authorized) service personnel.

△**WARNING** Replace missing, worn, or illegible decals.

△**WARNING Keep** owner's/service manual with jetter at all times.

△**WARNING Never** modify (alter) a Hi-Vac Corporation water Jetter.

△**WARNING Do** not use accessory devices not authorized by Hi-Vac Corporation.

△**WARNING** Do not remove any guards or covers.

△**WARNING Failure to follow these safety precautions may result in serious bodily and/or property damage.**

Operation

1. Check the engine oil and hydraulic oil levels.
2. Engine and pump maintenance schedules must be followed.
3. Connect the water line to the cart jetter.
4. Follow engine manufacturer's instructions for starting engine.
5. Engine should be started and warmed up for 3 to 5 minutes before applying any load.
6. The unit should be positioned as close to the cleaning location as possible.
7. Normal cleaning is started by using the penetrator nozzle, which should be attached at this time.
8. Unwind hose from the reel by pulling the hose off of the reel. Care should be taken not to damage the hose by keeping it clear of the manhole sides.
9. The point of the hose nozzle should be pointed upstream into the pipe rather than downstream.
10. Make sure water control valve lever is in correct position for cleaning. **NOTE:** The valve has two marked positions. One is marked High Pressure to Hose Reel, and the other is marked Re-Circulate, Wash down Gun (this position is for operating the washdown gun).
11. With the hose unreeled and pointed into the sewer or pipe, engage the engine by putting the clutch handle to the ON position. The nozzle will now start to carry itself into the sewer line and penetration will begin. The correct method of cleaning is to extend the hose into the line and gradually and slowly retract it. During the retraction you will note that cleaning or flushing takes place.
12. Adjust engine throttle by using the vernier throttle control unit (desired pressure is shown on the pressure gauge). More throttles produces more pressure which gives greater effort to drive the hose and nozzle into the line. Pressure is normally set at 2,500psi.
13. Unreel the hose, as needed allowing the nozzle to go further into the line. Short distances into the line are recommended on the first pass with slow retraction to flush the blockage of the line.
14. In large lines, or in lines with several clogs, repeated passages may be necessary to insure that the line is cleaned to your satisfaction.
15. When the pipe or line is cleaned, retract the hose and nozzle back **just short** of the end of the line. Reduce the throttle to near idle and turn water control valve to recirculate, washdown gun position.
16. Disengage the reel in the cleaning hose with the electric reel control.
17. Stop engine.

All machines have a low water warning, which flashes brightly when water is low in the supply tank.

Do not rely on these gauges to maintain your water jet unit.
Normal maintenance schedules must be followed.

Troubleshooting

As an aid in locating and correcting problems, which may occur in transit or while the unit is in operation, this section was developed to assist the operator in the diagnosis and repair of equipment failure.

Prior to disassembly or removal of components, check the following list for a quick reference to possible problem areas.

Problem	Probable Cause	Solution
Pulsation	Obstructed or worn valve Worn nozzle Air leak in inlet plumbing Inlet suction strainer clogged	Check valves and seats for worn surfaces Replace with nozzle of proper size Disassemble, reseal, and reassemble Clean, use adequate size, check frequently
Low Pressure	Worn plunger assembly Abrasives in pumped fluid Severe cavitations Inadequate water supply Fouled inlet or discharge valves Worn inlet or discharge valves Leaky discharge hose Restricted inlet Air entering the inlet plumbing	Rebuild plunger assembly Install proper screen filter in suction line Install proper screen filter in suction line Install proper screen filter in suction line Clean inlet and discharge valve assemblies Replace worn valves Replace hose Proper size inlet plumbing Check for air tight seal
Pump runs rough or pressure low	Inlet restrictions Air leaks Stuck inlet or discharge valve	Clean out obstructions Replace worn valves Replace worn valves
Short packing life	Abrasives in pumped fluid Excessive pressure Excessive temperature Running pump dry	Install proper screen filter in suction line Check pressure Check fluid temperature Install thermal relief valve DO NOT RUN PUMP DRY
Strong surging at inlet and Low pressure on discharge side	Foreign particles in valves Worn valves	Check for smooth lap surfaces on valves seats Damaged valves cannot be lapped but must be replaced
Oil leakage from drain plug	Loose or worn drain plug	Tighten or replace drain plug
Loud pump knock	Worn or broken bearing or connecting rod	Replace bearings or connecting rods

Problem	Probable Cause	Solution
Excessive crankshaft endplay	Worn main ball bearing	Replace ball bearing
Water in crankcase	Water condensing into crankcase	Change oil at 3 month or 200 hour intervals
Oil leaking from crankcase shaft	Bad bearing Bad crankshaft seal	Replace bearing Replace crankshaft seal
Will not siphon chemical	Dirty or clogged chemical hose strainer Worn injector orifice Wrong nozzle in wand	Clean or replace strainer Replace orifice Use brass soap injector nozzle
Pump overheating	Water left re-circulating in pump	Allow fresh water supply into pump
Pump and motor RPM & pressure spike	Clogged nozzle jets	Clean jets and check water supply for debris
Low pressure or no pressure when using hand gun	Wrong nozzle in hand gun	Use steel high pressure spray nozzle

Notes:

Engine System Troubleshooting

MALFUNCTION	CAUSE	REMEDY
Engine Will Not Start		
Check battery and fuse	Battery discharged Fuse burnt out	Recharge battery Replace fuse
Check control positions	Fuel valve OFF Choke OPEN Engine switch OFF	Move lever to ON Move lever to CLOSED unless engine is warm Turn engine switch to ON
Check fuel	Out of fuel Bad fuel; engine stored without treating or draining gasoline, or refueling with bad gasoline	Refuel Drain fuel tank and carburetor; refuel with fresh gasoline.
Remove and inspect spark plugs	Spark plugs faulty, fouled, or improperly gapped Spark plugs wet with fuel	Clean, gap, or replace spark plugs Dry and reinstall spark plugs; start engine with throttle lever in FAST position
Take engine to an authorized engine servicing dealer, or refer to shop manual	Fuel filter clogged, carburetor malfunction, valves stuck, etc.	Replace or repair faulty components as necessary
Engine Lacks Power		
Check air filter	Filter element(s) clogged	Clean or replace filter element(s)
Check fuel	Bad fuel; engine stored without treating or draining gasoline, or refueling with bad gasoline	Drain fuel tank and carburetor; refuel with fresh gasoline
Engine overheating	Insufficient air flow	Allow engine to cool
Take engine to an authorized servicing dealer or refer to shop manual		

Pump System Troubleshooting

MALFUNCTION	CAUSE	REMEDY
The Pressure and/or Delivery Drops	Worn packing seals	Replace packing seals
	Broken valve spring	Replace spring
	Worn or damaged nozzle	Replace nozzle
	Fouled discharge valve	Clean valve assembly
	Fouled inlet strainer	Clean strainer
	Worn or damaged hose	Repair/replace hose
	Worn or plugged relief valve	Clean, reset, and replace worn parts
	Cavitation	Check suction lines on inlet of pump for restrictions
	Unloader	Check for proper operation
Water In Crankcase	High humidity	Reduce oil change interval
	Worn Seals	Replace seals
Noisy Operation	Worn bearings	Replace bearings, refill crankcase oil with recommended lubricant
	Cavitation	Check inlet lines for restrictions and/or proper sizing

Pump System Troubleshooting (Continued)

MALFUNCTION	CAUSE	REMEDY
Rough/Pulsating Operation with Pressure Drop	Worn packing	Replace packing
	Inlet restriction	Check system for stoppage, air leaks, correctly sized inlet plumbing to pump
	Accumulator pressure	Recharge/replace accumulator
	Unloader	Check for proper operation
	Cavitation	Check inlet lines for restrictions and/or proper size
Pressure Drop at Gun	Restricted discharge plumbing	Resize discharge plumbing to flow rate of pump
Excessive Leakage	Worn plungers	Replace plungers
	Worn packing seals	Adjust or replace packing seals
	Excessive vacuum	Reduce suction vacuum
	Cracked plungers	Replace plungers
	Inlet pressure too high	Reduce inlet pressure
High Crankcase Temperature	Wrong grade of oil	Giant oil is recommended
	Improper amount of oil in crankcase	Adjust oil level to proper amount